Strategies to Achieve Mathematics Success
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Lesson 4  MULTIPLY BY 2-DIGIT NUMBERS

PART ONE: Learn About Multiplying Two 2-Digit Numbers

How can you use place value to multiply two 2-digit numbers?

Explore

You can use place value to multiply a 1-digit number by a 2-digit number.

How can you use place value to multiply two 2-digit numbers?

Find \(31 \times 24\).

31 = ___3__ tens and ___1__ one, or ___30__ + ___1__

24 = ___2__ tens and ___4__ ones, or ___20__ + ___4__

Think

To find \(31 \times 24\), you can use these steps:

1. Multiply the ones and tens in 31 by the ones in 24.
   
   \[
   \begin{array}{c}
   31 \\
   \times 24 \\
   \hline
   120 \leftarrow 4 \times 30 \\
   4 \leftarrow 4 \times 1
   \end{array}
   \]

2. Multiply the ones and tens in 31 by the tens in 24.
   
   \[
   \begin{array}{c}
   31 \\
   \times 24 \\
   \hline
   120 \leftarrow 4 \times 30 \\
   20 \leftarrow 20 \times 1 \\
   600 \leftarrow 20 \times 30
   \end{array}
   \]

3. Add the partial products.
   
   \[
   \begin{array}{c}
   31 \\
   \times 24 \\
   \hline
   4 \leftarrow 4 \times 1 \\
   120 \leftarrow 4 \times 30 \\
   20 \leftarrow 20 \times 1 \\
   + 600 \\
   \hline
   744
   \end{array}
   \]

The product of \(31 \times 24\) is 744.

Connect

Let's Talk

When you multiply a 2-digit number by a 2-digit number, there are 4 partial products. Why do you think this is so?
Fill in the blanks. Solve the problem.

In Jack’s class, there are 23 boxes of crayons. There are 36 crayons in each box. How many crayons are there in all?

\[ 23 \times 36 = \]

- Multiply the ones and tens in ______ by the ones in ______.
  \[
  \begin{array}{c}
  3 \ 6 \\
  \times \ 2 \ 3 \\
  \hline
  1 \ 8 \\
  9 \ 0 \\
  \end{array}
  \]
  \[
  \begin{array}{c}
  \hline
  \end{array}
  \]

- Multiply the ones and tens in ______ by the tens in ______.
  \[
  \begin{array}{c}
  3 \ 6 \\
  \times \ 2 \ 3 \\
  \hline
  1 \ 8 \\
  9 \ 0 \\
  \end{array}
  \]
  \[
  \begin{array}{c}
  \hline
  \end{array}
  \]

- Add the partial products.
  \[
  \begin{array}{c}
  3 \ 6 \\
  \times \ 2 \ 3 \\
  \hline
  1 \ 8 \\
  9 \ 0 \\
  1 \ 2 \ 0 \\
  \end{array}
  \]
  \[
  \begin{array}{c}
  +\ 6 \ 0 \ 0 \\
  \hline
  \end{array}
  \]

**Solution:** There are ______ crayons in all.

Now, use what you know to solve this problem.

1. There are 13 bagels in a baker’s dozen. How many bagels are there in 48 baker’s dozens?
   - A 264
   - B 524
   - C 552
   - D 624

Number and Operations

Multiply by 2-Digit Numbers
How can you find the product of two 2-digit numbers more quickly?

You know a quick way to multiply a 2-digit number by a 1-digit number.

1. Multiply the ones. \(4 \times 7 = 28\)
   - Regroup the 28 as 2 tens 8 ones.
   - Write 8 in the ones place.

2. Multiply the tens. \(4 \times 5\) tens = 20 tens
   - Add the 2 regrouped tens.
   - Write 22 in the hundreds place and tens place of the product.

What is a quick way to multiply a 2-digit number by a 2-digit number?

Find \(26 \times 53\).

Write 26 as tens and ones. \(26 = \underline{20} + \underline{6}\)

Write 53 as tens and ones. \(53 = \underline{50} + \underline{3}\)

To find \(26 \times 53\), you can use these steps:

1. Multiply \(6 \times 53\).
   - \(6 \times 3 = 18\) \(\rightarrow\) Regroup 18 as 1 ten 8 ones.
   - Write 8 ones.
   - Write the regrouped 1 ten.
   - \(6 \times 50 = 300\) \(\rightarrow\) Add 30 tens and the 1 regrouped ten.
   - Write 31 tens.

2. Multiply \(20 \times 53\).
   - \(20 \times 3 = 60\) \(\rightarrow\) Write 60 below 318.
   - \(20 \times 50 = 1,000\) \(\rightarrow\) Write 10 hundreds.

3. Add the partial products.

The product of \(26 \times 53\) is 1,378.

Explain how you could use the problem \(30 \times 50\) to check that your answer to \(26 \times 53\) makes sense.
Fill in the blanks. Solve the problem.

A farm stand sells 25 eggs in one basket. There are 28 baskets for sale. How many eggs are for sale in all?

\[ 28 \times 25 = \square \]

- Think of 25 as _______ tens and _______ ones.
- Think of 28 as _______ tens and _______ ones.

- Multiply 8 \times 25.
  \[
  \begin{array}{c}
  8 \\
  \times 25 \\
  \hline
  \square \square
  \end{array}
  \]
  Write the regrouped ten(s).

- Multiply 20 by _______.
  \[
  \begin{array}{c}
  20 \\
  \times 28 \\
  \hline
  \square \square
  \end{array}
  \]
  Cross out the old regrouped ten(s).

- Add the partial products.
  \[
  \begin{array}{c}
  1 \\
  25 \\
  \times 28 \\
  \hline
  200 \\
  + 500 \\
  \hline
  \square \square
  \end{array}
  \]

Solution: There are _______ eggs.

Now, use what you know to solve this problem.

2. Some jets can travel 95 miles in a single minute! How far could that kind of jet travel in 25 minutes?

\[ 95 \times 25 = \square \text{ miles} \]
Solve the problem. Then read why each answer choice is correct or not correct.

Mario put 37 shells in each of 26 boxes. How many shells did Mario put in the boxes in all?

\[
\begin{array}{c}
37 \\
\times 26
\end{array}
\]

A. 296

B. 922

C. 962

D. 976

Check to see if you chose the correct answer.

\[
\begin{array}{c}
1 \\
\times
\end{array}
\]

\[
\begin{array}{c}
37 \\
\times 26
\end{array}
\]

Multiply 6 × 37. 6 × 37 = 222

Multiply 20 × 37. 20 × 37 = 740

Add partial products. 222 + 740 = 962

So, the correct answer is C.

Why are the other answer choices not correct?

A. 296 37 should be multiplied by 20, not 2.

B. 922 When finding 6 × 37, the regrouped 4 tens should have been added to the product.

D. 976 The product of 6 × 7 is 42, not 56.
Solve each problem. Use the hints to avoid mistakes.

- Multiply the ones and tens in the top number by the ones in the bottom number. Then multiply the ones and tens in the top number by the tens in the bottom number.
- Don’t forget to add any regrouped tens.
- Cross out the first regrouped tens after you add them to the partial product. That way you won’t add them twice.
- Add the partial products.

3.  
\[ \begin{array}{c}
31 \\
\times 28
\end{array} \]

- A 248
- B 310
- C 668
- D 868

5.  
\[ \begin{array}{c}
32 \\
\times 19
\end{array} \]

- A 320
- B 508
- C 598
- D 608

4. Matthew practiced his trumpet for 26 minutes each day for 18 days. How many minutes did Matthew practice in all?

\[ \begin{array}{c}
26 \\
\times 18
\end{array} \]

- A 234 minutes
- B 428 minutes
- C 468 minutes
- D 868 minutes

6. Marcell is giving out fliers about a school concert. He gives 35 fliers to each store in town. There are 44 stores in town. How many fliers did Marcell give out in all?

\[ \begin{array}{c}
35 \\
\times 44
\end{array} \]

- A 1,320
- B 1,540
- C 1,640
- D 1,760
A vet has 29 containers of dog food. Each container has 53 ounces of dog food. How many ounces of dog food does the vet have in all?

Use pictures, words, or numbers to show your work.

\[
\begin{array}{c}
\times \\
53 \\
29 \\
\hline
477 \\
+ 1,060 \\
\hline
1,537
\end{array}
\]

Solution: \(1,537\) ounces

Explain how you got your answer.

**First, I multiplied the ones in 29 by 53:** \(9 \times 53 = 477\).

**Then I multiplied the tens in 29 by 53:** \(20 \times 53 = 1,060\).

**Last, I added the partial products to get the product:** \(477 + 1,060 = 1,537\).
7. There are 46 rows in a concert hall. Each row has 63 seats. How many seats are there in all?

Use pictures, words, or numbers to show your work.

Solution: ________ seats

Explain how you got your answer.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________
As you solve problems with multiplication, remember to:
• multiply the tens and ones in one number by the tens and ones in the other number.
• add the regrouped numbers.
• add the partial products.

Solve each problem.

8. \[42 \times 29\]
   \[\text{A} \quad 462\]
   \[\text{B} \quad 798\]
   \[\text{C} \quad 1,218\]
   \[\text{D} \quad 1,318\]

9. There are 36 inches in one yard. How many inches are there in 32 yards?
   \[36 \times 32\]
   \[\text{A} \quad 180 \text{ inches}\]
   \[\text{B} \quad 1,052 \text{ inches}\]
   \[\text{C} \quad 1,142 \text{ inches}\]
   \[\text{D} \quad 1,152 \text{ inches}\]

10. \[23 \times 36\]
    \[\text{A} \quad 207\]
    \[\text{B} \quad 828\]
    \[\text{C} \quad 834\]
    \[\text{D} \quad 928\]

11. There are 28 people at a play. Each person paid $35 for a ticket. How much money did the people pay in all?
    \[35 \times 28\]
    \[\text{A} \quad $350\]
    \[\text{B} \quad $840\]
    \[\text{C} \quad $970\]
    \[\text{D} \quad $980\]
12. \[64 \times 61\]
   - A 1,504
   - B 3,704
   - C 3,784
   - D 3,904

13. \[57 \times 28 = \square\]
   - A 1,596
   - B 1,605
   - C 1,646
   - D 1,696

14. There are 47 classes at Josiah’s elementary school. Each class has 23 students in it. How many students are in the school in all?

   Solution: \[\square\] students

   Explain how you got your answer.

15. At a store, there are 38 packages of ribbon. Each package has 54 ribbons in it. How many ribbons are there in all?

   Use pictures, words, or numbers to show your work.

   Solution: \[\square\] ribbons

   Explain how you got your answer.